

## Element Level Bridge Inspection (Bridge Management and Inspection Technologies)

**Problem:**

Bridge preservation, improvement and replacement needs exceed authorized budgets.

**Background:**

There are over 590,000 highway bridges throughout the Nation with an average age of 43 years and over 160,000 of those bridges are considered deficient, either structurally deficient or functionally obsolete. The deck area carried on these deficient bridges is approximately 88 million square meters and with an average bridge replacement cost of 1,110 \$/sq. m, it would take \$98 billion to replace these deficient bridges. Approximately \$3.35 billion in Federal-aid Highway Bridge Replacement and Rehabilitation funds were authorized in FFY 2003. In addition to a 20% state match, this would provide for \$4.19 billion, a far cry from \$98 billion.

Bridge deficiencies (needs) are currently determined from data submitted annually to FHWA by State Highway Agencies using the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges criteria. This has been a long accepted method for determining rehabilitation and replacement needs on a National basis, but is not detailed enough for determining bridge element preservation (maintenance, repair and rehabilitation) needs.

The NBI condition data alone makes for challenging decisions when faced with difficult questions such as:

- What are the preservation needs for a bridge or a network of bridges?
- What types of preservation work should be performed?
- Should preservation, improvement or replacement actions be performed?
- Which bridges first?

**Solution:**

Implement element level bridge inspection practices.

**What is element level bridge inspection?**

*Element level bridge inspection* is a bridge condition assessment process based on the use of the AASHTO commonly recognized (CoRe) elements and agency non-CoRe elements, their description, definition, units of measure, condition states and feasible actions.

**Why use element level bridge inspection?**

- More precise condition assessment of bridges.
- More quantitative condition data.
- Element data beyond a deck, superstructure and substructure per bridge.
- Supported in the AASHTO Pontis bridge management system software.

**Where are the successes?**

Many states are using element level inspection at various degrees of sophistication. Leading states include: California, Florida, Kansas, Montana, Oregon, South Dakota, South Carolina and Oregon.

**What are the expected benefits?**

- More uniform condition assessment of bridge elements.
- Quantitative data more easily used for systematically determining bridge preservation needs.
- Extend the useful service life of bridges.
- Minimize adverse impacts to the traveling public.

**Additional Resources**

To learn more, visit

<http://www.fhwa.dot.gov/resourcecenter/index.htm>

**For more information, contact:**

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**NBI*****Condition Assessment:***

Deck (LS)

Superstructure (LS) Substructure (LS)

Element Level

***Condition Assessment:***

Concrete Deck (Sq. M)

PS Girders (LM)

Painted Steel Girder (LM)

RC Abutments (LM)

RC Piers (LM)

RC Approach Slabs (SM)

Painted Steel Railing (LM)

Expansion Joints (LM)

Fixed Bearings (EA)

Expansion Bearings (EA)